United States Of America

Department of Transportation - Federal Aviation Administration

Supplemental Type Certificate

Number SH657NW

This Certificate issued to Siam Hiller Holdings, Inc.
925 M Street
Firebaugh, California 93622

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part * *of the Civil Air Regulations and Federal Aviation Regulations.* * See page 6 of this STC for certification basis.

Original Product Type Certificate Number: 2H3

Make: Bell

Model: 47G-2A, 47G-2A-1, 47G-3B, 47G-3B-1, 47G-3B-2, 47G-3B-2A, 47G-4, 47G-4A, 47G-5, 47G-5A

Description of Type Design Change: Installation of an Allison 250-C10D (T63-A-700), 250-C18A, 250-C18C, 250-C20, or 250-C20B engine and related changes in accordance with Hiller Aircraft Corporation Master Drawing List 660-100 reissued on March 22, 1991, November 30, 1995, and January 1, 1999, or later FAA approved revisions; or Soloy Corporation Master Drawing List 660-100 dated August 1, 1979, or later FAA approved revisions. (See Note 9 of STC Addendum SH657NW).

Limitations and Conditions: Approval of this change in type design applies basically to the above model rotorcraft only. This approval should not be extended to other rotorcraft of this model on which other previously approved modifications are incorporated unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of these rotorcraft. A copy of the STC and Addendum No. SH657NW must be included in the permanent records for the modified rotorcraft. If the holder agrees to permit another person to use this certificate to alter the product, the holder shall give the other person written evidence of that permission.

This certificate and the supporting data, which is the basis for approval, shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: November 11, 1974

Date of issuance: September 7, 1978

Date reissued: 03/22/91; 11/30/95; 06/17/99; 08/19/05; 04/15/09; 5/15/09

Date amended: 09/15/78; 11/16/78; 01/03/79; 02/05/79; 04/10/79; 05/03/79; 05/28/79; 11/28/79; 05/20/80; 02/11/81; 03/09/81; 02/15/91; 03/22/91; 05/09/95; 08/07/95; 06/30/99

By direction of the Administrator

(Signature)

Supervisor, Technical & Administrative Support Staff, Los Angeles Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

INSTRUCTIONS: The transfer endorsement below may be used to notify the appropriate FAA Regional Office of the transfer of this Supplemental Type Certificate.

The FAA will reissue the certificate in the name of the transferee and forward it to him.

TRANSFER ENDORSEMENT

Transfer the ownership of the Supplemental Type Certificate Number_____

to *(Name of transferee)*_____

*(Address of transfer)*_____
(Number and street)

_____
(City, State, and Zip code)

from *(Name of grantor) (Print or type)*_____

(Address of grantor) _____
(Number and street)

_____
(City, State, and Zip code)

Extent of Authority (if licensing agreement):_____

_____

_____

_____

Date of Transfer:_____

Signature of grantor *(In ink)*:_____

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Number SH657NW ADDENDUM

The limitations and conditions of Type Certificate Data Sheet 2H3 apply except as follows:

This STC Addendum, which is part of Supplemental Type Certificate No. SH657NW, prescribes limitations and conditions under which the product for which the STC was issued meets the airworthiness requirements of the certification basis stated herein. A copy of this STC Addendum is required to be maintained as part of this modified rotorcraft permanent records.

SUPPLEMENTAL TYPE CERTIFICATE HOLDER: Siam Hiller Holdings, Inc.

Bell 47G Series as modified by this STC (normal category)

Engine	Allison 250-C10D (T63-A-700), 250-C18A, 250-C18C, 250-C20, 250-C20B		
Fuel	MIL-T-5624 grade JP-4 or JP-5, aviation turbine fuels ASTM D1655 Jet A or A-1 (or Allison spec. EMS) or Jet B. See FAA approved Rotorcraft Flight Manual for alternate cold weather and emergency fuels.		
Oil	Engine MIL-L-7808G or MIL-L-23699B and subsequent revisions thereto. Transmission MIL-L-6082 grade 100, 80, 60, or 40 (See RFM).		
Engine Rating (5 minutes)	With 600 series Transmission	With 900 series Transmission	
	260.6 H.P.	270.0 H. P.	
	See Note 3 for applicable conditions.		

Engine Limits	Gas producer (N_1)	250-C10D (T63-A-700) 250-C18A/C18C	250-C20/C20B
	Max. continuous	104% (53,165 RPM)	105% (53,518 RPM)
	Transient overspeed (15 seconds)	105% (53,676 RPM)	106% (54,028 RPM)

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Engine Limits

Output shaft (N_2)
For all steady state conditions 100%
6000 RPM for 250-C10D (T63-A-700), C250-C18A/C18C
6016 RPM for 250-C20/C20B)

Transient overspeed (15 seconds)
250-C20D (T63-A-700), 250-C18A/C18C:
Varies from 110% (6600 RPM) at idle to 105%
(6300 RPM) at takeoff.

250-C20/C20B: Varies from 113% (6900 RPM) at idle to 105%
(6411 RPM) at takeoff.

Torque (5 minutes) Sea level to	With 600 Series Transmission 250-C10D (T63-A-700) 250-C18A/C18C	250-C20/C20B	With 900 Series Transmission 250-C10D (T63-A-700) 250-C18A/C18C	250-C20/C20B
14,000 feet	78 psi	63.0 psi	81 psi	65.0 psi
16,000 feet	73 psi	59.0 psi	75 psi	60.0 psi

Straight-line variation between points given.

(Max. Cont.) Sea level to 16,000 feet	66 psi	50.5 psi	66 psi	50.5 psi

Turbine Outlet Temperature	250-C10D (T63-A-700) 250-C18A/C18C	250-C20	250-C20B
Max. cont.	693°C (1280°F)	737°C (1359°F)	738°C (1360°F)
Takeoff (5 min.)	749°C (1380°F)	793°C (1460°F)	810°C (1490°F)
Transient (6 sec.)	843°C (1550°F)	843°C (1550°F)	843°C (1550°F)

Oil Inlet Temperature

Engine:	Maximum	225°F	Minimum	-65°F
Transmission:	Maximum	130°C (266°F)		

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Rotor Limits	Power on – N_2 Tach	
	Maximum	355.5 rpm (100%)
	Minimum	348 rpm (98%)
	Power off – Rotor Tach	
	Maximum	370 rpm (104%)
	Minimum	322 rpm (90.6%)
Airspeed Limits	Skid Gear – CAS	
	Sea level to 4,000 ft.	105 mph
	4,000 ft. to 16,000 ft.	decrease V_{NE} 5mph per 1,000 ft.
Altitude Limit	16,000 feet	
C. G. Range	Gross Weight	Longitudinal
	2950 lbs.	(-2.0) to (+2.5)
	2300 lbs.	(-2.0) to (+4.0)
	2100 lbs.	(-2.0) to (+4.0)
Maximum Weight	2950 lbs.	
Number of Seats	3 (pilot and 2 passengers)	(-30)
Maximum Baggage	See loading instructions in FAA approved Rotorcraft Flight Manual.	
Fuel Capacity	61.6 Gal. (+5) (usable 57.5 Gal.) See Note 1.	
Oil Capacity	Engine	5.5 quarts
	Transmission	5 quarts

Rotor Blade and Control Movements (Rigging): For rigging information, refer to Bell Model 47G -3B-1 maintenance manual for the turbine converted model rotorcraft listed on this certificate except where superseded by Hiller Aircraft Corporation Service Bulletin 01-660 dated November 14, 1978, or later FAA approved revision, or Soloy Conversions, Ltd Service Bulletin 01-660 dated November 14, 1978, or later FAA approved revision.

Serial Numbers Eligible same as shown on Type Certificate Data Sheet 2H3.

Data Pertinent to All Models

Datum	Same as shown on Type Certificate Data Sheet 2H3.

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Certification Basis

1. Civil Air Regulation (CAR) 6 effective December 20, 1956, including amendment 6-1, 6-3, 6-4 (Exemption No. 70 for Model 47G-3 and Exemption No. 2950 for all those turbine powered models listed in this STC with the extended skid gear modification installed).

2. The following paragraphs of Federal Aviation Regulations part 27: 27.33(b)(3) (Amdt. 27-2), 27.45 thru 27.79 (Amdt. 27-1), 27.143 (Amdt. 27-1), 27.361(a) (Amdt. 27-1), 27.901 thru 27.991 (Amdt. 27-1), 27.993 (Amdt. 27-2), 27.995 thru 27.1091 (Amdt. 27-1), 1093(b)(1) (Amdt.27-9), 27.1121 thru 27.1145 (Amdt. 27-1), 27.1163 (Amdt. 27-2), 27.1183 thru 27.1193 (Amdt. 27-1), 27.1194 (Amdt. 27-2), 27.1195 (Amdt. 27-5), 27.1301 thru 27.1309 (Amdt. 27-1), 27.1337 (Amdt. 27-1), 27.1351 (Amdt. 27-1), 27.1353 (Amdt. 27-1), 27.1521 (Amdt. 27-1), 27.1549 thru 27.1559 (Amdt. 27- 1), 27.1583(b) and (f) (Amdt 27-1), 27.1587 (Amdt. 27-1), 27.1589 (Amdt. 27-1).

Equipment

The following must be installed in the rotorcraft for airworthiness certification subsequent to the incorporation of this STC.

1. The basic required equipment as prescribed in the applicable airworthiness regulations (see certification basis outlined above).

2. FAA approved Hiller Aircraft Corporation Rotorcraft Flight Manual dated November 4, 1998, or later FAA approved revision, or Soloy Corporation Rotorcraft Flight Manual dated September 6, 1978, which is required in lieu of that specified for the basic unmodified Bell 47G series.

   NOTE: Equipment items approved for the basic Bell 47G series are not eligible with this STC unless such items are also shown in the above noted flight manual.

3. Ballast must be installed in accordance with Hiller Aircraft Corporation Drawing List 660-100 dated January 1, 1999, or Soloy Corporation Drawing 660-100 dated August 1, 1979, or later FAA approved drawings.

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NOTE 1. Current weight and balance data, including a list of equipment included in the certificated empty weight and loading instructions when necessary, must be provided at the time of airworthiness certification for return to service. The certificated empty weight and corresponding center of gravity location must include unusable fuel and undrainable oil as follows:

Fuel: 13.9 lbs. (+5)
Oil: Negligible

NOTE 2. Refer to the applicable FAA approved Rotorcraft Flight Manual for required placards and instrument markings.

NOTE 3. The rating shown for the Allison 250-C20 and 250-C20B engines is based on zero ram, dry inlet air, no accessory loads, and no bleed air; and is available at sea level to approximately ISA +40°F. See Powercheck Charts for power available from C10/C18 series engines in RFM Supplement No. 10.

NOTE 4. Except where superseded or supplemented by the items listed below, the retirement times for the modified Bell 47G series rotorcraft are unchanged from that listed in Type Certificate Data Sheet 2H3. These additional/superseded times are as follows:

Component	Part Number	Replacement Period Hours
Adapter plate	Soloy 660-2101	3750
Drive shaft	Soloy 660-2408	4000
Engine mount (basket)	Bell 47-612-171-123	2500

Bell P/N 47-130-110-1 main rotor thrust bearing is not eligible for use on Bell 47 rotorcraft incorporating this turbine conversion.

NOTE 5. Information essential to the maintenance and servicing of rotorcraft modified in accordance with this STC is contained in the pertinent model Bell Helicopter Company maintenance and overhaul instructions and in the Soloy Corporation supplements to these documents.

NOTE 6. External load operations under part 133 must be conducted within the limitations and in accordance with the requirements of the FAA Approved Rotorcraft Flight Manual Supplement for the Hiller or Soloy cargo hook support system. Models equipped with

the 900 series transmission meet the structural requirements of the certification basis for external load operations at 3200 pounds maximum gross weight provided the weight in excess of 2950 pounds is not imposed on the landing gear.

NOTE 7. For Allison 250-C10D (T63-A-700), 250-C18A/C18C, and 250-C20/C20B engine installations, a hydraulic pump drive gearbox and pump is eligible to be installed in accordance with appropriate data contained in Soloy Drawing List 660-100 dated August 1, 1979, or later, for use with various hydraulic powered equipment installations. This gearbox and pump may be installed on rotorcraft to be operated in normal category provided deactivation procedures contained in Hiller or Soloy Service Instruction 66002 have been complied with. Limitations and conditions to be subsequently evaluated as part of the installation and operation of these various items of hydraulically powered equipment (spray systems, etc.) are also contained in this above-mentioned Service Instruction. An Allison 250-C18A/C18C, 250-C20/C20B fuel line modification must be accomplished in accordance with Hiller or Soloy STC SH769NW prior to installation of the above discussed Hydraulic Pump Drive Gearbox and Pump, Hiller or Soloy Service Instruction 66002.

NOTE 8. The Soloy Turbine Converted Bell 47G series rotorcraft with the 900 series transmission has demonstrated satisfactory operation in the restricted category agriculture special purpose at 3200 lbs. gross weight with the limitations specified in the FAA approved Flight Manual Supplement for the Cargo Hook/Load Support Kit. If operations are conducted which involve imposing 3,200 lbs. on the landing gear, the rotorcraft must be inspected in accordance with Hiller or Soloy Service Bulletin No. 16-660 and found satisfactory before it is returned to the standard category. Agriculture systems approved for installation must provide a dump capability to be eligible for gross weight operation in excess of 2,950 lbs.

NOTE 9. Installation of an Allison 250-C10D (T63-A-700), 250-C18A, or 250-C18C engine must be in accordance with Hiller Aircraft Master Drawing List 660-100 revised January 1, 1999, or later FAA approved revisions; or Soloy Master Drawing List 660-100 revision dated March 27, 1989, or later FAA approved revisions.

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